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The Maryland Fruit Grower

September, 1934

Maryland State
Horticultural Society

FERTILIZING RED RASPBERRIES

Reporting in the Ohio Bi-Monthly Bulletin (May-June 1934, Vol. 19, No. 168 J. S. Shoemaker of Ohio Agr. Exp. Sta. gives results of experiments in the use of nitrogen fertilizers on red raspberry. Six rows, each 84 feet long, were used, three of which were given annual spring applications of sulfate of ammonia at the rate of 250 pounds per acre, applied about 2 feet from the plants and some scattered in the plant rows. Three rows were unfertilized as checks. The plants were set in 1929; 2 feet apart, in rows 8 feet apart, and the fertilizer was applied in 1931—1932—1933.

In 1931, 351 more canes; 1932, 545 more canes; and 1933, 668 more canes were formed in the 3 fertilized rows (252 feet) than in the check rows. The diameter of the fertilized canes was larger, and canes were taller. In 1932 the yield of the fertilized rows was 118.5 pints better than the check rows, and in 1933, 102.2 pints above the check rows.

From results obtained, Dr. Shoemaker suggests the following:

1. Nitrogen fertilizer should be applied to provide:
   (a) A suitable number of canes for a high yield.
   (b) A high proportion of tall canes of large diameter.
   (c) Dark green leaves which are associated with a high rate of plant manufacture.
2. In pruning:
   (a) Summer topping of reds should be avoided.
   (b) The dormant pruning should be as light as is compatible with suitable training, freedom from damage in cultivation, ease of harvesting, and avoidance of undesirable small berries near the ends of the canes and in accordance with the fertility, moisture supply, and other factors that influence the growth status of the plants.
   (c) The rows of plants should be kept comparatively narrow.
   (d) Only short, slender canes should usually be thinned out in the rows.
   (e) The canes should be encouraged to grow tall enough so that a height of 5 to 5½ feet can be maintained after pruning and such canes should be supported by wires in the row system and by stakes in the hill system.
3. Other practices:
   Humus should be supplied, moisture should be conserved, the possibilities of irrigation should be considered, other elements besides nitrogen should not be lacking in the soil, drainage should be good, and practices in general should be encouraged early rather than late in the season. A high yield in a given red raspberry variety is largely dependent on a large amount per area of the most highly productive kind of fruiting wood.

FROM VIRGINIA

The August, 1934 issue of Virginia Fruit contains an article advising growers not to sacrifice their fruit, as there is a shortage of fruit and a likely increased demand for even the by-product grades. As a final remark the article states "The greatest depressing influence this year may be the buyer (or grower) who sells at ridiculously low prices before the price level is well established on the basis of the increased demand and the short crop." This, of course, may not mean excessive prices, but at least a fair return to the grower.

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NITROGEN AND KEEPING QUALITY

In the 1933-34 Report of the Maryland Agricultural Experiment Station, the following comments appear:

"Comparing fruits grown under nitrogen fertilization and no nitrogen fertilization in Maryland, it has been impossible to find any direct influence of nitrogen on firmness or keeping quality. Likewise, parallel studies on respiration and chemical composition failed to demonstrate any marked differences, attritutable to the use of nitrogen fertilizer. It should be emphasized that the above results apply to fruits of similar size, maturity and color; that is, if a grower markets a certain variety of fruit of a given size and color, picked at a mature stage or ripeness, its storage quality is equal to fruit of similar size, color, and maturity of another grower regardless of the fertilizer used by either grower. If differences in color, size, or maturity are present, as a result of any practice or condition of culture, they make consequent changes in keeping quality, as for example, large fruits have poorer keeping quality than smaller fruits, highly colored fruits are markedly better than poorly colored fruits, and both immature and over-mature fruits have poor storage quality.

Nitrogen fertilizers may be accused of so-called indirect effects on keeping quality by adversely influencing size, color, and maturity, but these effects of nitrogen are largely under the control of the grower, and hence, certain errors of practice and precautions are well worth mentioning. Growers in the Shenandoah Valley have been justly criticized for harvesting certain varieties of apples in an immature condition, and since nitrogen fertilizers delay maturity, it is apparent that growers, using nitrogen, will have more immature fruit, if harvested at the same time as no-nitrogen fruit. A delay in maturity of several days necessitates a later harvest for the grower who uses nitrogen, if he does not want fruit of immature condition which has poor keeping quality.

A heavy set of apples or peaches will markedly decrease color of the fruits, and hence affect keeping quality. Nitrogen fertilizers are used in early spring on apples and peaches, to assist in getting a set of fruit, and sometimes a heavy set results, but the grower who does not thin such fruits, naturally has fruit of poor color and keeping quality. Stimulation of growth of wood and leaves by nitrogen necessitates better pruning to keep an open tree and to avoid the excess shading that results in poor color. Lack of proper pruning and fruit thinning, following nitrogen fertilization, probably are the two main faults of growers that result in fruits of poor keeping quality with consequent adverse criticisms, and even price differentiation against nitrogen-fertilized fruits. However, this work as well as the experience of many growers, has demonstrated that the judicious use of nitrogen fertilizers, followed by proper cultural practices, has resulted in larger crops of well colored fruit, with little or no sacrifice in keeping quality. Larger size of fruits which may result often are desired by the grower, avoiding

excess size by adjusting the application of nitrogen to conditions of tree growth.

The strawberry grower in particular, must use nitrogen cautiously when excess plant growth is apt to contribute to conditions favoring development of field rots, and too large berries. A certain increase in size of berry by use of nitrogen may offset in value any loss due to shipping quality. However, nitrogen may have these indirect effects as a result of increased size of fruit or plant growth which may be greatly increased in rainy seasons and are not controlled by the grower, except partially by the moderate use of nitrogen in the fertilizer mixture.

Considering the above discussion, together with the results of this work one can find justification for criticism of nitrogen-fertilized fruits which rests not on the fertilizer as such but rather the misuse of this valuable orchard fertilizer and the mistakes of the grower in adapting himself to responses induced. In fact, excess pruning has often resulted, especially with peaches, in large, poorly colored fruit of poor keeping quality, whereas a moderate pruning gave ideal results, clearly another case of misuse of a method of controlling the tree responses.

The future work on the problem will include a more detailed study of the factor of maturity in its relation to fertilizers and keeping quality. The earlier work considered only fully matured fruits, from the various treatments. Many growers harvest fruits in a less mature state, particularly for export of such apple varieties as Jonathan and Grimes. The question arises, how early may he pick his fruit and still obtain satisfactory storage and edible quality, and how will fertilizers, particularly nitrogen, affect this relationship?

HANDLE THEM EASY

With a short crop, it will pay to make every apple "grade" as well as possible. Every bruise is a blemish. See that the pickers handle the fruit carefully. Don't let them fill crates too full. Use plenty of old feed sacks on the grader where the fruit is dumped. Old inner tubes make excellent pads. Use padding wherever fruit may be bruised. It will pay. Metal picking buckets holding a half bushel may slow up the picking a little bit, but growers who have used these containers are much in favor of them. The old precaution to "handle apples like eggs" is as true now as it ever was.

CRACKING OF APPLES

While reports have not been received from all parts of Maryland, it is known that in some orchards Stayman apples have cracked very seriously, and in large numbers. In some cases, the cracked fruit has fallen from the trees. The same condition is found in nearby states. Generally this cracking condition is caused by sudden changes in the moisture supply of the tree, and there seems to be little that can be done about it, except to try to keep the soil moisture supply rather steady. There is usually less cracking of fruit in orchards well supplied with organic matter. The soil was so dry in July that any sudden rain was likely to result in cracking of fruit, especially since the Stayman fruits had, in most cases, practically stopped growing, before any helpful rains occurred.

MORE ABOUT NITROGEN FERTILIZER

There is getting to be a feeling among growers that nitrogen alone is not sufficient for proper tree growth and production. Research workers are still reporting good results where nitrogen alone is used.

Dr. G. F. Potter of New Hampshire states that as a four years' average, the yield of McIntosh trees under cultivation was not increased by the use of complete fertilizer as compared to nitrogen fertilizer used alone. A mature Baldwin orchard in sod, definitely yielded less when fertilized with tankage that did a similar block receiving nitrogen fertilizer only.

Overholser and Overley, working in Washington State found that there was a fairly definite relationship between average leaf area per tree and average terminal growth, yield and size of individual apples. Trees receiving nitrogen only had relatively larger leaf area, greater terminal growth and normal size of individual apples, despite increased yields. Trees receiving phosphoric acid, and potash without nitrogen were about like the check trees, except that the fruits were smaller despite decreased yields. Phosphorus or potash used alone gave less terminal growth, yield and fruit size than the check trees not fertilized.

Dr. Walter Thomas at Pennsylvania Experiment Station, working with three-year-old Stayman trees, which were planted in metal cylinders using Hagerstown Clay Loam soil, found that after 2 years of fertilization with a complete fertilizer, the trees showed, by analysis, that they had used about 30% of the added nitrogen, 1.6% of the phosphoric acid, and 11% of the added potash.

It would be dangerous to conclude that all orchard soils would show the same results. We are rather sure that nitrogen alone will give good tree growth and yield. We likewise know that fruit trees are tolerant of considerable acidity in the soil. However, we have the cover crop to consider. If the soil needs lime, phosphorus or potash to produce a good cover crop, it seems only good management to care for these needs, apply nitrogen to our trees besides, and then let the trees use whatever they may need for good growth and yield.

RETURNS

Cornell Extension Service reports that cost accounts kept on farms in New York, where soil and climate were favorable, show that apples have been one of the best paying enterprises. From 1920 to 1932, apples paid 65 cents an hour for time spent on them, after all other costs were paid.

APPLES FOR HEALTH

Dr. Harry Beckman, professor of pharmacy at Marquette University School of Medicine, Milwaukee states that experimental work shows that ripe, mellow apples, peeled, cored, and grated into a paste will cure "summer complaint" in children. This paste is given to the patient for two days. No other food is allowed, and there is no limit to the amount of paste that the child may be allowed to eat. At the end of 2 days, the patient is given a normal diet, consisting of protein foods, and little milk or fats. If the cure is not complete, another two days diet of apple paste usually completes the cure. This should be good news for the kids, and should be of help to the apple industry. Fruit need not be advertised as a medicine, but the public should know of its goodness, flavor, and tonic effects.

SOIL MOISTURE

The past summer caused fruit growers to consider very seriously, the question of soil moisture. It is interesting to note that at every summer meeting held by fruit growers in the East, this year, some speaker discussed the moisture problem. It seems that either the use of cover crops, or irrigation of some sort are the only remedies offered. Irrigation is costly, and is not always possible, but it may come, even as washing of fruit has come slowly into the fruit growing business. In the meantime, the use of mulching material, and the growing of cover crops, together with proper soil management for moisture-holding are our best hopes. Soils men are finding more and more about calcium, magnesium, aluminum, etc., in relation to good or poor growth of cover crops. Best results from cover crop growth are impossible where soil is too acid or alkaline.

Mr. F. W. Oldenburg of the University of Maryland Extension Service has compiled some data which should be of interest to fruit and vegetable growers as it affects both cover crops and vegetables. Briefly, the data is as follows:

Using the hydrogen ion scale, pH 7 indicates neutral soil reaction. A larger figure indicates alkalinity and a smaller figure indicates acid (sour) condition.

Group 1. Plants growing best in sweet soils. Very sensitive to acid conditions. Grow best at pH 7 or range from pH 6 to pH 8.
Alfalfa, sweet clover, carrots.

Group 2. Plants grow best in sweet (neutral) or nearly sweet soils. Not so sensitive to alight acidity. Grow best at pH 7 orrange from pH 6 to pH 8.
Asparagus, lettuce, celery, red and white clovers, barley.

Group 3. Plants not so sensitive to acid soils as Group 1 and 2. Have a fairly wide range, but do best on neutral or nearly neutral soils. Grow best at pH 6.5 to pH 7 or range from pH5.5 to pH 7.
Cabbage, rape, cauliflower, kohlrabi, kale, Brussels sprouts, turnips, spinach, beans, beets, peas, cucumbers, cantaloupes, corn, wheat, bluegrass. Also tomatoes and soybeans, but these have a still wider range of soil reaction.

Group 4. Plants do well on moderately acid soils. Grow best at pH 6 or range from pH 5.5 to pH 7.
Lima beans, cowpeas, alsike clover, lespedeza. Also buckwheat, rye and oats, but these will tolerate a little more acidity.

Group 5. Plants do well on every acid soil. Grow best at pH 5.5 or range from pH 4.5 to pH 7.
Potatoes, strawberries, tobacco, peanuts, watermelons, bentgrasses.

Where growers are uncertain as to fertilizer required for proper cover crop growth, or whether soils need lime, a sample of soils should be given to the county agent for inspection.

Teacher: "James, have you whispered while I was out of the room?"
James: "Only wunst, ma'am."
Teacher: "Helen, should James say 'wunst'?"
Helen: "No, ma'am, he should say twict."

FRUIT RUSSETING

After considerable thorough research, Dr. J. H. Gourley and Mr. Leon Havis of Ohio Agricultural Experiment Station have published a paper regarding fruit russeting. As a summary of their work, they state:

"Russeting injury may or may not be within the control of the orchard operator and an analysis of the factors involved in here presented.

"When the skin is slightly injured from any cause, the superficial cells are replaced by cork cells which give the surface the characteristic russet color. Beneath the epidermal layer a cork cambium is formed whose cells divide, as is characteristic of a cambium, and cork cells are produced to the outside. There may be few or many such cells cut off, giving a light or heavy russet. In this process the cuticle of the skin is destroyed, or partially so, and loss of water follows.

"Mechanical brushing or wiping machines used in the removal of spray residue did not measurably remove the cuticle, as determined by an eye-piece micrometer. This would bear out the practical experience that keeping quality of the fruit is not reduced by this process.

"The chief factor of the environment associated with russeting under Ohio conditions is topography. High lands or locations with good air drainage show less of it than low lands or depressions.

"Dilute or modified sprays or dusts are less toxic than caustic or concentrated ones and the injury is still further reduced by the addition of extra lime. Bordeaux mixture is more likely to cause russeting than lime-sulfur.

"Coarse sprays are particularly damaging; hence, the regulation of nozzles and guns is important.

"Spraying when the temperature is above 82° F. and when the humidity is high is conducive to russeting."

PEACH BORER

It is really late to discuss the "gassing" of trees for peach borer control, but in case the treatment has not been applied, this matter should be attended to at once.

The material used in treatment is paradichlorobenzene, sold under various trade names such as Crystal Gas, Dichlorocide, P C B, P D B, etc. Its use is not recommended on trees under three years of age. For three year old trees, one-half ounce is suggested, increasing the dosage on older trees, so that trees six years old and above, receive one ounce per tree.

The treatment for borer control is as follow: Clean the trash away from the base of the tree, being careful not to break the soil crust any more than necessary. Measure out the necessary amount of paradichlorobenzene, and scatter it in a narrow ring about the base of the tree, not less than 1½ inches from the tree trunk. Then mound soil about the tree base, patting it down with the back of the shovel. The mounds may be left up all winter and removed early next spring. Don't guess at the amounts applied. Better use some small container that will hold just the amount necessary for use on one tree.

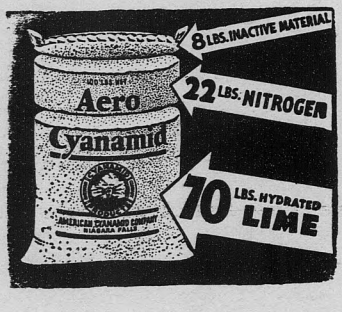
A soil temperature of about 70° is necessary to volatilize the material, so that it is not a matter to be delayed.

The pie manufacturers of this country are planning to increase the sales of their products, which have dropped off quite a few million dollars in sales volume. The interesting fact is, that of all the kinds of pie made for public sale, apple pie is the favorite, and is the best seller.

Fertilize
YOUR APPLE TREES THIS FALL!

USE

AERO CYANAMID



THE *Superior* FRUIT FERTILIZER

[Carefully-conducted tests show that Aero Cyanamid applied to apples, peaches, and small fruits in the Fall gives results equally as good as when applied in the spring.]

EASE OF APPLICATION AND ECONOMY OF TIME FAVOR FALL APPLICATION

It is easier to get about over the orchard in the fall than during early spring when the soil is thawing out. Spring is also a very busy season, and it is a great convenience to have gotten the task of applying the fertilizer out of the way of other spring work.

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